International Conference on

Seawater Desalination Technologies on the Threshold of the New Millennium

Revival of the R&D Golden Era (1952–1972)

4–7 November 2000, Kuwait

Contents

Proceedings Volumes 1,2

Desalination Volumes 134, 135

Proceedings Volume 1

Desalination Volume 134

Background 1

Session 1. Integrated Systems

Cogeneration for power and desalination — state of the art review
A. M. El-Nashar (Abu Dhabi, UAE) 7

Integrated system for complete usage of components in seawater. A proposal of inorganic chemical combinat on seawater
H. Ohya (Yokohama, Japan), T. Suzuki (Yamanashi, Japan), S. Nakao (Tokyo, Japan) 29

Integrated power, water and salt generation: a discussion paper
M. Ahmed (Al-Khod, Oman), A. Arakel (Pennant Hills, Australia), D. Hoey (Dangar, Australia), M. Coleman (Mundijong, Australia) 37

Session 2. Progress in Reverse Osmosis Systems

Progress in membrane science and technology for seawater desalination — a review
T. Matsuura (Ottawa, Canada) 47

Thirteen years' experience treating a seawater RO plant
E.G. Darton (Slough, UK), E. Buckley (Gibraltar) 55

Experimental RO facility to study heating effect of raw water varying main parameters
M.H. Ali El-Saie, Y.M.H. Ali El-Saie, M. Abd El Aziz (Cairo, Egypt) 63

Chemical cleaning of reverse osmosis membranes
S.S. Madaeni (Kermanshah, Iran), T. Mohamamdi, M.K. Moghadam (Tehran, Iran) 77

Designing seawater RO for clean and fouling RO feed. Desalination experiences with the FilmTec SW30HR-380 and SW30HR-320 elements. Technical–economic review
J.A. Redondo (Rheinmünster, Germany), A. Casañas (Bilbao, Spain) 83

Analysis of Boujdour desalination plant performance
M. Hafsi (Rabat, Morocco) 93

Potential use of magnetic fields — a perspective
C.V. Vedavyasan (Mumbai, India) 105

Session 3. Progress in the Design of Desalination Systems
The energetics of desalination processes
K.S. Spiegler, Y.M. El-Sayed (Fremont, CA, USA) 109
Designing desalination systems for higher productivity
Y.M. El-Sayed (Fremont, CA, USA) 129
Solar distillation with economies of scale, innovation and optimization
R.L. Hummel (Toronto, Canada) 159
The economic feasibility of small solar MED seawater desalination plants for remote arid areas
A.M. El-Nashar (Abu Dhabi, UAE) 173
Simulation of thermal desalination processes
A. Jernqvist, M. Jernqvist (Lund, Sweden), G. Aly (Al Ain, UAE) 187
Simulation of multistage flash desalination process
O.A. Hamed, M.AK.Al-Sofi, M. Imam, G.M. Mustafa, K. Bamardouf,
H. Al-Washmi (Al-Jubail, Saudi Arabia) 195
Plates — the next breakthrough in thermal desalination
J.B. Tonner, S. Hinge, C. Legorreta (Soeborg, Denmark) 205
High advanced open channel membrane desalination (disc tube module)
Th.A. Peters (Neuss, Germany) 213

Session 4. Thermal Desalination Systems
New idea for co-generation power desalting plants due to abandoned MSF desalination process
M.A. Darwish (Kuwait) 221
Performance of MSF desalination plant components over fifteen years at Madinat Yanbu Al-Sinayah
A.D. Khawaji, J.-M. Wie (Yanbu Al-Sinaiyah, Saudi Arabia) 231
Available safety margins of time and antiscalant dose rate
M.AK. Al-Sofi, O.A. Hamed, K. Bamardouf, A.G.I. Dalvi, H. Al-Washmi, M.N.M. Kither,
Y. Al-Aseeri (Al-Jubail, Saudi Arabia) 241
Re-use of vacuum and vent system condensate
A.R. Abu Dayyeh, R. Hamdan, W.F. Zaki, A.S. Abutalib (Ruwi, Oman) 249
Seawater desalination in Kuwait using multistage flash evaporation technology - historical overview
Y. Al-Wazzan, F. Al-Modaf (Safat, Kuwait) 257
Performance study of enhanced and smooth surface tubes in a system condenser of a multi stage flash desalination unit
A.Y. Kalendar (Kuwait), A.J. Griffiths (Cardiff, UK) 269

Closing Remarks and Recommendations 285

Author Index 289

Proceedings Volume 2
Desalination Volume 135

Background 1

Session 5. Management and Economic Aspects in Desalination
The management of desalinated water
T.A. Dabbagh (High Wycombe, UK) 7

Financial, economical and technical aspects of establishing remote desalination plants
M.H. Ali El-Saie, Y.M.H. Ali El-Saie, A.D. Moneer (Cairo, Egypt) 25
The fresh water supply prospect of Tan Tan city from non-conventional water resources
K. Tahri (Rabat, Morocco) 43

Session 6. Process Control and Environment Aspects in Desalination
Automation and process control of reverse osmosis plants using soft computing methodologies
A. Zilouchian, M. Jafar (Boca Raton, FL, USA) 51
Improved performance and cost reduction of RO seawater systems using UF pretreatment
M. Wilf (Oceanside, CA, USA), M.K. Schierach (Germany) 61
Biofouling potential and environmental factors of seawater at a desalination palnt intake
P.K. Abdul Azis, I. Al-Tisan, N. Sasikumar (Al-Jubail, Saudi Arabia) 69
Adaptive receptive fields for radial basis functions
M.M. Jafar, A. Zilouchian (Boca Raton, FL, USA) 83
Chloride stress corrosion cracking resistance of 6% Mo stainless steel alloy (UNS N08367)
J.D. Fritz, R.J. Gerlock (Brackenridge, PA, USA) 93
Materials performance in SWRO desalination plant at KISR research and development program
A. Al-Odwani, J. Carew, M. Al-Tabtabaei, A. Al-Hijji (Safat, Kuwait) 99
Modified electrochemical emission spectroscopy (MEES) as NDT technique for detecting localized corrosion of copper alloys in seawater
K. Habib (Safat, Kuwait) 111

Session 7. Research and Development in Desalination
Seawater desalination – SWCC experience and vision
Mohammad AK. Al-Sofi 121
15 years of R&D program in seawater desalination at KISR. Part I. Pretreatment technologies for RO systems
S. Ebrahim, M. Abdel-Jawad, S. Bou-Hamad, M. Safar (Safat, Kuwait) 141
15 years of R&D program in seawater desalination at KISR. Part II. RO system performance
M. Abdel-Jawad, E.E.F. El-Sayed, S. Ebrahim, A. Al-Saffar, M. Safar, M. Tabtabaei, G. Al-Nuwaibit (Safat, Kuwait) 155

Session 8. Energy Aspects in Desalination
Nuclear desalination: history and prospects
M.M. Megahed (Cairo, Egypt) 169
Potential of nuclear desalination in the Arabian Gulf countries
I.S. Al-Mutaz (Riyadh, Saudi Arabia) 187
Energy performance enhancements of a 950 m^3/d seawater reverse osmosis unit in Grand Cayman
W.T. Andrews (Hamilton, Bermuda), W.F. Pergande, G.S. McTaggart (Minnetonka, MN, USA) 195
Reduction of the energy demand for sea water RO with the pressure exchange system PES
P. Geisler (Netphen, Germany), W. Krumm (Siegen, Germany), Th.A.Peters (Neuss, Germany) 205

Closing Remarks and Recommendations 211

Author Index 215